

## SEQUENCE LISTING

### (1) GENERAL INFORMATION:

- (i) APPLICANT: Margolis, Benjamin L.
- (ii) TITLE OF INVENTION: METHODS AND COMPOSITIONS FOR TREATMENT OF BREAST CANCER
- (iii) NUMBER OF SEQUENCES: 21
- (iv) CORRESPONDENCE ADDRESS:
  - (A) ADDRESSEE: PENNIE & EDMONDS LLP
  - (B) STREET: 1155 Avenue of the Americas
  - (C) CITY: New York
  - (D) STATE: New York
  - (E) COUNTRY: U.S.A.
  - (F) ZIP: 10036-2711
- (v) COMPUTER READABLE FORM:
  - (A) MEDIUM TYPE: Floppy disk
  - (B) COMPUTER: IBM PC compatible
  - (C) OPERATING SYSTEM: PC-DOS/MS-DOS
  - (D) SOFTWARE: PatentIn Release #1.0, Version #1.25
- (vi) CURRENT APPLICATION DATA:
  - (A) APPLICATION NUMBER: US 08/207,575
  - (B) FILING DATE: 07-MAR-1994
  - (C) CLASSIFICATION:
- (viii) ATTORNEY/AGENT INFORMATION:
  - (A) NAME: Coruzzi, Laura A.
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  - (C) REFERENCE/DOCKET NUMBER: 7683-053
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### (2) INFORMATION FOR SEQ ID NO:1:

- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 6 amino acids
  - (B) TYPE: amino acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: unknown
- (ii) MOLECULE TYPE: peptide
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO:1:  
Gly Xaa Gly Xaa Xaa Gly  
1 5

### (2) INFORMATION FOR SEQ ID NO:2:

- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 4 amino acids
  - (B) TYPE: amino acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: unknown
- (ii) MOLECULE TYPE: peptide
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO:2:

Val Ala Val Lys

1

(2) INFORMATION FOR SEQ ID NO:3:

- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 5 amino acids
  - (B) TYPE: amino acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: unknown

(ii) MOLECULE TYPE: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:3:

Gly Met Xaa Tyr Leu

1

5

(2) INFORMATION FOR SEQ ID NO:4:

- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 9 amino acids
  - (B) TYPE: amino acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: unknown

(ii) MOLECULE TYPE: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:4:

Ile His Arg Asp Leu Ala Ala Arg Asn

1

5

(2) INFORMATION FOR SEQ ID NO:5:

- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 6 amino acids
  - (B) TYPE: amino acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: unknown

(ii) MOLECULE TYPE: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:5:

Lys Trp Met Ala Pro Glu

1

5

(2) INFORMATION FOR SEQ ID NO:6:

- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 6 amino acids
  - (B) TYPE: amino acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: unknown

(ii) MOLECULE TYPE: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:6:

Lys Trp Thr Ala Pro Glu

1

5

(2) INFORMATION FOR SEQ ID NO:7:

- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 6 amino acids
  - (B) TYPE: amino acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: unknown

(ii) MOLECULE TYPE: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:7:

Phe Trp Tyr Ala Pro Glu  
1 5

(2) INFORMATION FOR SEQ ID NO:8:

- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 7 amino acids
  - (B) TYPE: amino acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: unknown

(ii) MOLECULE TYPE: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:8:

Ser Asp Val Trp Ser Phe Gly  
1 5

(2) INFORMATION FOR SEQ ID NO:9:

- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 334 amino acids
  - (B) TYPE: amino acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: unknown

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:9:

Arg Asp Ser Ser Arg Leu Cys Val Val Lys Val Tyr Ser Glu Asp Gly  
1 5 10 15

Ala Cys Arg Ser Val Glu Val Ala Ala Gly Ala Thr Ala Arg His Val  
20 25 30

Cys Glu Met Leu Val Gln Arg Ala His Ala Leu Ser Asp Glu Ser Trp  
35 40 45

Gly Leu Val Glu Ser His Pro Tyr Leu Ala Leu Glu Arg Gly Leu Glu  
50 55 60

Asp His Glu Phe Val Val Glu Val Gln Glu Ala Trp Pro Val Gly Gly  
65 70 75 80

Asp Ser Arg Phe Ile Phe Arg Lys Asn Phe Ala Lys Tyr Glu Leu Phe  
85 90 95

Lys Ser Pro Pro His Thr Leu Phe Pro Glu Lys Met Val Ser Ser Cys  
100 105 110

Leu Asp Ala Gln Thr Gly Ile Ser His Glu Asp Leu Ile Gln Asn Phe  
115 120 125

Leu Asn Ala Gly Ser Phe Pro Glu Ile Gln Gly Phe Leu Gln Leu Arg

130	135	140
Gly Ser Gly Arg Gly Ser Gly Arg Lys Leu Trp Lys Arg Phe Phe Cys 145 150 155 160		
Phe Leu Arg Arg Ser Gly Leu Tyr Tyr Ser Thr Lys Gly Thr Ser Lys 165 170 175		
Asp Pro Arg His Leu Gln Tyr Val Ala Asp Val Asn Glu Ser Asn Val 180 185 190		
Tyr Val Val Thr Gln Gly Arg Lys Leu Tyr Gly Met Pro Thr Asp Phe 195 200 205		
Gly Phe Cys Val Lys Pro Asn Lys Leu Arg Asn Gly His Lys Gly Leu 210 215 220		
His Ile Phe Cys Ser Glu Asp Glu Gln Ser Arg Thr Cys Trp Leu Ala 225 230 235 240		
Ala Phe Arg Leu Phe Lys Tyr Gly Val Gln Leu Tyr Lys Asn Tyr Gln 245 250 255		
Gln Ala Gln Ser Arg His Leu Arg Leu Ser Tyr Leu Gly Ser Pro Pro 260 265 270		
Leu Arg Ser Val Ser Asp Asn Thr Leu Val Ala Met Asp Phe Ser Gly 275 280 285		
His Ala Gly Arg Val Ile Asp Asn Pro Arg Glu Ala Leu Ser Ala Ala 290 295 300		
Met Glu Glu Ala Gln Ala Trp Arg Lys Lys Thr Asn His Arg Leu Ser 305 310 315 320		
Leu Pro Thr Thr Cys Ser Gly Ser Ser Leu Ser Ala Ala Ile 325 330		

(2) INFORMATION FOR SEQ ID NO:10:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 348 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:10:

Lys Glu Ala Lys Val Thr Lys Ile Phe Val Lys Phe Phe Val Glu Asp 1 5 10 15
Gly Glu Ala Leu Gln Leu Leu Ile Asp Glu Arg Trp Thr Val Ala Asp 20 25 30
Thr Leu Lys Gln Leu Ala Glu Lys Asn His Ile Ala Leu Met Glu Asp 35 40 45
His Cys Ile Val Glu Glu Tyr Pro Glu Leu Tyr Ile Lys Arg Val Tyr 50 55 60
Glu Asp His Glu Lys Val Val Glu Asn Ile Gln Met Trp Val Gln Asp 65 70 75 80
Ser Pro Asn Lys Leu Tyr Phe Met Arg Arg Pro Asp Lys Tyr Ala Phe



residues"

(ix) FEATURE:

- (A) NAME/KEY: Modified-site
- (B) LOCATION: 2, 21, 23 and 101
- (D) OTHER INFORMATION: /label= Xaa  
/note= "Xaa at these positions = Basic residues"

(ix) FEATURE:

- (A) NAME/KEY: Modified-site
- (B) LOCATION: 3, 7, 9, 11-19, 22, 28-31, 36-42, 44, 48  
50, 51, 53, 55-70, 74, 76, 78-90, 92, 94  
96-98, 106 109 and 110
- (D) OTHER INFORMATION: /label= Xaa  
/note= "Xaa at these positions = Non-consensus  
residues"

(ix) FEATURE:

- (A) NAME/KEY: Modified-site
- (B) LOCATION: 24, 33-35 and 91
- (D) OTHER INFORMATION: /label= Xaa  
/note= "Xaa at these positions = Aromatic  
residues"

(ix) FEATURE:

- (A) NAME/KEY: Modified-site
- (B) LOCATION: 99, 100, 102 and 103
- (D) OTHER INFORMATION: /label= Xaa  
/note= "Xaa at these positions = Acidic residues"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:11:

Xaa	Xaa	Xaa	Gly	Phe	Leu	Xaa	Lys	Xaa	Gly	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
1				5					10					15		
Xaa	Xaa	Xaa	Trp	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
			20					25					30			
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Pro	Xaa	Gly	Xaa	Xaa	Xaa	Xaa
			35					40				45				
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
			50				55					60				
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Asn	Xaa	Phe	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
65					70				75							80
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
				85					90						95	
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Trp	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
				100				105							110	

(2) INFORMATION FOR SEQ ID NO:12:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 111 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE TYPE: protein

(ix) FEATURE:

- (A) NAME/KEY: Modified-site
- (B) LOCATION: 1

- (D) OTHER INFORMATION: /label= Xaa  
/note= "Xaa = Isoleucine or Valine"
- (ix) FEATURE:  
(A) NAME/KEY: Modified-site  
(B) LOCATION: 2, 69 and 102  
(D) OTHER INFORMATION: /label= Xaa  
/note= "Xaa at these positions = Arginine or Lysine"
- (ix) FEATURE:  
(A) NAME/KEY: Modified-site  
(B) LOCATION: 5  
(D) OTHER INFORMATION: /label= Xaa  
/note= "Xaa = Tyrosine or Tryptophan"
- (ix) FEATURE:  
(A) NAME/KEY: Modified-site  
(B) LOCATION: 7, 11-17, 22, 28, 29, 31, 33, 35, 38-42  
46, 47, 50-52, 58-68, 70, 72, 74, 76-78  
80-92, 96, 98, 109, 110  
(D) OTHER INFORMATION: /label= Xaa  
/note= "Xaa at these positions = Non-consensus residues"
- (ix) FEATURE:  
(A) NAME/KEY: Modified-site  
(B) LOCATION: 8, 9, 18 and 21  
(D) OTHER INFORMATION: /label= Xaa  
/note= "Xaa at these positions = Lysine or Arginine"
- (ix) FEATURE:  
(A) NAME/KEY: Modified-site  
(B) LOCATION: 19  
(D) OTHER INFORMATION: /label= Xaa  
/note= "Xaa = Threonine or Serine"
- (ix) FEATURE:  
(A) NAME/KEY: Modified-site  
(B) LOCATION: 24  
(D) OTHER INFORMATION: /label= Xaa  
/note= "Xaa = Tryptophan or Tyrosine"
- (ix) FEATURE:  
(A) NAME/KEY: Modified-site  
(B) LOCATION: 26 and 57  
(D) OTHER INFORMATION: /label= Xaa  
/note= "Xaa at these positions = Valine or Isoleucine"
- (ix) FEATURE:  
(A) NAME/KEY: Modified-site  
(B) LOCATION: 30  
(D) OTHER INFORMATION: /label= Xaa  
/note= "Xaa = Aspartic Acid or Glycine"
- (ix) FEATURE:  
(A) NAME/KEY: Modified-site  
(B) LOCATION: 34  
(D) OTHER INFORMATION: /label= Xaa  
/note= "Xaa = Leucine or Tyrosine"
- (ix) FEATURE:  
(A) NAME/KEY: Modified-site  
(B) LOCATION: 36  
(D) OTHER INFORMATION: /label= Xaa

/note= "Xaa = Tyrosine or Phenylalanine"

(ix) FEATURE:  
 (A) NAME/KEY: Modified-site  
 (B) LOCATION: 37  
 (D) OTHER INFORMATION: /label= Xaa  
       /note= "Xaa = Lysine or Glutamic Acid"

(ix) FEATURE:  
 (A) NAME/KEY: Modified-site  
 (B) LOCATION: 55  
 (D) OTHER INFORMATION: /label= Xaa  
       /note= "Xaa = Cysteine or Valine"

(ix) FEATURE:  
 (A) NAME/KEY: Modified-site  
 (B) LOCATION: 56  
 (D) OTHER INFORMATION: /label= Xaa  
       /note= "Xaa = Glutamine or Glutamic Acid"

(ix) FEATURE:  
 (A) NAME/KEY: Modified-site  
 (B) LOCATION: 71  
 (D) OTHER INFORMATION: /label= Xaa  
       /note= "Xaa = Asparagine or Histidine"

(ix) FEATURE:  
 (A) NAME/KEY: Modified-site  
 (B) LOCATION: 75 and 108  
 (D) OTHER INFORMATION: /label= Xaa  
       /note= "Xaa at these positions = Isoleucine  
       or Leucine"

(ix) FEATURE:  
 (A) NAME/KEY: Modified-site  
 (B) LOCATION: 93  
 (D) OTHER INFORMATION: /label= Xaa  
       /note= "Xaa = Phenylalanine or Leucine"

(ix) FEATURE:  
 (A) NAME/KEY: Modified-site  
 (B) LOCATION: 94  
 (D) OTHER INFORMATION: /label= Xaa  
       /note= "Xaa = Glutamine or Alanine"

(ix) FEATURE:  
 (A) NAME/KEY: Modified-site  
 (B) LOCATION: 97  
 (D) OTHER INFORMATION: /label= Xaa  
       /note= "Xaa = Serine or Threonine"

(ix) FEATURE:  
 (A) NAME/KEY: Modified-site  
 (B) LOCATION: 102 and 103  
 (D) OTHER INFORMATION: /label= Xaa  
       /note= "Xaa at these positions = Glutamic Acid  
       or Aspartic Acid"

(ix) FEATURE:  
 (A) NAME/KEY: Modified-site  
 (B) LOCATION: 105  
 (D) OTHER INFORMATION: /label= Xaa  
       /note= "Xaa = Valine or Methionine"

(ix) FEATURE:  
 (A) NAME/KEY: Modified-site  
 (B) LOCATION: 111



(D) OTHER INFORMATION: /label= Xaa  
/note= "Xaa = Alanine or Valine"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:12:

Ile Arg Glu Gly Tyr Leu Xaa Lys Lys Gly Xaa Xaa Xaa Xaa Xaa Xaa  
1 5 10 15  
Xaa Lys Thr Trp Lys Xaa Arg Trp Phe Val Leu Xaa Xaa Asp Xaa Leu  
20 25 30  
Xaa Leu Xaa Tyr Lys Xaa Xaa Xaa Xaa Xaa Pro Lys Gly Xaa Xaa Pro  
35 40 45  
Leu Xaa Xaa Xaa Ser Val Cys Gln Val Xaa Xaa Xaa Xaa Xaa Xaa  
50 55 60  
Xaa Xaa Xaa Xaa Arg Xaa Asn Xaa Phe Xaa Ile Xaa Xaa Xaa Asp Xaa  
65 70 75 80  
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Phe Gln Ala Xaa  
85 90 95  
Ser Xaa Glu Glu Arg Glu Glu Trp Val Lys Ala Ile Xaa Xaa Ala  
100 105 110

(2) INFORMATION FOR SEQ ID NO:13:

(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 6 amino acids  
(B) TYPE: amino acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: unknown

(ii) MOLECULE TYPE: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:13:

Asp Leu Arg Ala Ala Asn  
1 5

(2) INFORMATION FOR SEQ ID NO:14:

(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 8 amino acids  
(B) TYPE: amino acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: unknown

(ii) MOLECULE TYPE: peptide

(ix) FEATURE:

(A) NAME/KEY: Modified-site  
(B) LOCATION: 2  
(D) OTHER INFORMATION: /label= Xaa  
/note= "Xaa = Isoleucine or Valine"

(ix) FEATURE:

(A) NAME/KEY: Modified-site  
(B) LOCATION: 3  
(D) OTHER INFORMATION: /label= Xaa  
/note= "Xaa = Lysine or Arginine"

(ix) FEATURE:

(A) NAME/KEY: Modified-site

- (B) LOCATION: 5
- (D) OTHER INFORMATION: /label= Xaa  
/note= "Xaa = Threonine or Methionine"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:14:

Pro Xaa Xaa Trp Xaa Ala Pro Glu  
1 5

(2) INFORMATION FOR SEQ ID NO:15:

- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 7 amino acids
  - (B) TYPE: amino acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: unknown

(ii) MOLECULE TYPE: peptide

(ix) FEATURE:

- (A) NAME/KEY: Modified-site
- (B) LOCATION: 5
- (D) OTHER INFORMATION: /label= Xaa  
/note= "Xaa = Valine or Isoleucine"

(ix) FEATURE:

- (A) NAME/KEY: Modified-site
- (B) LOCATION: 7
- (D) OTHER INFORMATION: /label= Xaa  
/note= "Xaa = Valine or Isoleucine"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:15:

Xaa Pro Xaa Tyr Xaa Asn Xaa  
1 5

(2) INFORMATION FOR SEQ ID NO:16:

- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 10 amino acids
  - (B) TYPE: amino acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: unknown

(ii) MOLECULE TYPE: peptide

(ix) FEATURE:

- (A) NAME/KEY: Modified-site
- (B) LOCATION: 8
- (D) OTHER INFORMATION: /label= Xaa  
/note= "Xaa = Hydrophobic Residue"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:16:

Xaa Pro Xaa Xaa Pro Pro Pro Xaa Xaa Pro  
1 5 10

(2) INFORMATION FOR SEQ ID NO:17:

- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 7 amino acids
  - (B) TYPE: amino acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: unknown

(ii) MOLECULE TYPE: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:17:

Pro Pro Val Pro Pro Arg Arg  
1 5

(2) INFORMATION FOR SEQ ID NO:18:

(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 6 amino acids  
(B) TYPE: amino acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: unknown

(ii) MOLECULE TYPE: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:18:

Asp Leu Arg Ala Ala Asn  
1 5

(2) INFORMATION FOR SEQ ID NO:19:

(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 6 amino acids  
(B) TYPE: amino acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: unknown

(ii) MOLECULE TYPE: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:19:

Asp Leu Ala Ala Arg Asn  
1 5

(2) INFORMATION FOR SEQ ID NO:20:

(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 6 amino acids  
(B) TYPE: amino acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: unknown

(ii) MOLECULE TYPE: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:20:

Phe Leu Ile Arg Glu Ser  
1 5

(2) INFORMATION FOR SEQ ID NO:21:

(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 6 amino acids  
(B) TYPE: amino acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: unknown

(ii) MOLECULE TYPE: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:21:

Phe Leu Val Arg Glu Ser  
1 5